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The classification adopted is at some points radically different from that employed in the first edition, particularly as regards the primary divisions of the class. The number of 'orders' now adopted for North-American birds, which belong all to the 'sub-class' Carinatae, is thirteen, subdivided into twenty sub-orders, sixty-three families, and seventy-seven sub-families.

The twelve years which have passed since the appearance of the original edition of the 'Key,' have been marked by a striking increase in our knowledge of North-American birds. This advance would alone render any general work on the subject, published at that date, to some extent antiquated and unsatisfactory, however excellent it may have been in its time. The old 'Key' has unquestionably had a career of usefulness, and has helped on the advance that has so strongly characterized the last decade of North-American ornithology; the object of the treatise being to enable any one, by its aid, to identify his specimens without recourse to other information than that the book itself afforded. The undertaking was to some extent, at least in its methods, an innovation in zoölogy, and, however well it may have served its purpose, was obviously open to improvement, as such attempts must always be. Its defects were doubtless as quickly seen by its author as by others; and to remedy these, and bring the work down to date, the author was led to prepare this much enlarged, and in many ways greatly improved, second edition. The first edition emphasized, and in a large degree initiated, a new departure in respect to the status of many forms of North-American birds, which were degraded from species in regular standing to the grade sub-species or geographical races, and referred, as 'varieties,' to the species from which they were found to be not completely differentiated. Since that time the custom has arisen and become established, among American ornithologists, of discarding the interpolated 'var.' between the varietal and specific names of such forms; and, in accordance with this custom, the new 'Key' adopts the new 'trinomial' nomenclature for such intergrading forms as it seems wise to recognize in nomenclature. The names are, in fact, strictly those of the author's revised 'Check-list,' published in 1882, *plus* about a dozen since added.

As regards paper and typographical execution, the work is all that need be desired; the composition and press-work being that of the Cambridge University press. The author tells us that his publishers generously allowed him

'to make the book to suit himself,' sparing no expense to which they might in consequence be put. While some of the cuts are not above criticism, many of them are fine, so that their average grade is high; and in nearly every case their origin is duly accredited. The work as a whole is certainly very tastefully executed.

WIEDEMANN'S ELECTRICITY.

Die lehre von der elektricität. Von GUSTAV WIEDEMANN. 2 vols. Braunschweig, Vieweg, 1882-83. 11+795, 7+1002 p. 8°.

THE work which forms the subject of this notice is the successor to 'Die lehre vom galvanismus und elektromagnetismus,' by the same author, first published in 1861, and followed by a second edition in 1874. Ever since its publication, the original work has been recognized as a practically exhaustive treatise on the topics included within the limits set by the author. Every discovery and observation is referred to the original publication, and its date is given. These references, so characteristic of the previous work, are continued and extended in the present treatise; and they form a classified index to the literature of electricity with the historical advantage of dates. One is surprised at the extent and range of the literature to which reference is made.

It is a suggestive fact, that a third edition simply of the original work could not represent the present knowledge of galvanic electricity and electromagnetism with that unity and completeness which the author's plan contemplated. The separation between static and galvanic electricity, which obtained up to the middle of the present century, can no longer be maintained: hence Professor Wiedemann wisely decided to extend the scope of his work, and to prepare with immense labor a practically new book under the more comprehensive title of 'Electricity.' This decision must be universally approved; for, aside from the very evident advantage of having a complete treatise in place of a partial one, the present conception of electricity forbids the treatment of the subject under its historical divisions. This division, which seemed imperative twenty-five or thirty years ago, has now become impossible. No fundamental differences between the two classes of electricity, due to different methods of generation, are now recognized. With galvanometers sufficiently sensitive to be affected by static discharges, on the one hand, and with electrometers capable of measuring

with great ease the difference of potential between the poles of a single cell, on the other, it is readily seen that static electricity acquires its predominant but not exclusive character from great difference of potential, while galvanic electricity produces its most striking effects by the transfer of great quantities of electricity as a current. The terms 'static' and 'galvanic' serve only to denote the extremes of electrical phenomena. In fact, the contact theory of potential difference unifies the whole science by giving a common account of the historically diverse forms of static and galvanic electricity; for it is now generally believed that the potential difference in frictional machines is due to contact of dissimilar bodies, while the old contest which began with Volta and Galvani is now set at rest by the happy compromise of assigning electromotive force to contact, and the energy of the current to chemical action.

The first volume of Professor Wiedemann's new work treats of general electrical phenomena, the excitation of electricity by contact of dissimilar bodies, Ohm's law and its consequences, determination of resistance in a great variety of bodies, measurement of electromotive force, and galvanic elements. The second volume is devoted to dielectrics, the theory of frictional and influence machines, the relations between heat and electricity, and to electrochemistry.

Mathematical treatment of the subject is introduced so far as it serves to establish general principles or theories, and to discuss methods and confirm results. Beyond this, mathematical discussions, which are interesting as mathematical exercises, but which do not advance our knowledge of physical principles, are either omitted entirely, or are referred to by citation.

The applications of electricity are noticed only so far as they serve to give completeness to a scientific knowledge of the subject.

It was reported a year ago that the manuscript of the two concluding volumes was nearly ready for the press.

Professor Wiedemann has placed all physicists under obligations by his full and logical presentation of all the facts and principles of the science of electricity. While the work does not possess the originality of Maxwell's, and is written with an entirely different purpose, it must, nevertheless, be classed with it as one of the great works on electricity. Considered from the point of view of giving a complete account of what is known respecting this branch of physics, and of showing what each investi-

gator has contributed to our common stock of knowledge of electricity, this book is not equalled by any other in any language.

H. S. C.

NOTES AND NEWS.

No piece of news of wider interest has traversed the wires of two continents since *Science* was founded than that which announced last week the rescue of the Greely party. The story of their frightful sufferings, their sad losses, and the successful accomplishment of their duties, is briefly told in the two despatches from Lieut. Greely, which we print in full below. It appears, that, when found, they were huddled in a tent, which the force of the gale had blown down upon them. The strongest of them could hold aloft the signal-flag, to guide the relief-party they could hear but not see, for two brief minutes only; and the weakest begged to be left to die in peace. Their provisions were utterly exhausted, and they had been living for weeks on a stew made from their sealskin clothing, with lichens and small shrimps; and it is highly probable that a detention of the relief-party for two days would have cost the entire party their lives.

The following two despatches from Lieut. Greely were received by the chief signal-officer on July 17:—

Brainard, Bierderbick, Connell, Fredericks, Long, and myself, the sole survivors, arrived to-day, having been rescued at the point of death from starvation by relief-ships *Thetis* and *Bear*, June 22, at Camp Clay, north-west of Cape Sabine. All are now in good health, but weak. Sergeant Ellison, who was rescued, died July 8. Cross died last January; Christianson, Linn, Rice, Lockwood, Jewell, and Edwards, in April; Ellis, Rainston, Whisler, Israel, in May; Kingsbury, Salor, Henry, Bender, Pavy, Gardiner, Schneider, in June. Abandoned Fort Conger Aug. 9. Frozen in pack, off Victoria Head, Aug. 29. Abandoned steam-launch, Sept. 11, eleven miles north-east of Cocked Hat Island. When on the point of landing, we were three times driven by south-west storms into Nares Sea. Finally landed, Sept. 29, in Baird Inlet. Learning by scouting-parties of the Proteus disaster, and that no provisions had been left for us from Cape Isabella to Sabine, moved, and established winter quarters at Camp Clay, halfway between Sabine and Cocked Hat. An inventory showed, that by a daily ration of four and one-third ounces of meat, seven of bread and dog-biscuit, and four ounces miscellaneous, the party would have ten days' full rations left for crossing Smith Sound to Littleton Island, March 1. Unfortunately, Smith Sound remained open the entire winter, rendering crossing impossible. Game failed, despite daily hunting, from early in February. Before the sun returned, only five hundred pounds of meats were obtained. This year minute shrimps, seaweed, sassafras, rock-lichens, and sealskin were resorted to for food, with results as shown by the number of survivors. Last regular food issued May 14. Only a hundred and fifty pounds